

Seat  
No.

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मधुर - 052

**Power Electronics - II (New)**  
**(1290)**

P. Pages : 2

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **any two** question from each unit.
5. Use of non-programmable calculator is allowed.
6. Assume suitable data if necessary.
7. Draw neat diagrams wherever necessary.

**UNIT - I**

1. Explain the criteria for selecting drive components. 10
2. A 15hp, 220V, 2000rpm separately excited dc motors controls a load requiring a torque  $T_L = 45 \text{ N - m}$  at a speed of 1200rpm. Field circuit resistance  $R_F = 147\Omega$ , armature circuit resistance  $R_a = 0.25\Omega$  & the voltage constant of the motor is  $K_V = 0.7032 \text{ V / A - rad / S}$ . The field voltage is 220V. The viscous friction & no load losses are negligible. Armature current can be assumed to be continuous & ripple free. Determine -  
i) back emf  $e_g$ .  
ii) required armature voltage  $E_a$ .  
& iii) rated armature current of the motor. 10
3. Draw & explain line frequency controlled converters from 1  $\phi$  and 3  $\phi$  input. 10

**UNIT - II**

1. A four pole, 10hp, 460V motor is supplying its rated power to a centrifugal load at a 60 Hz frequency. Its rated speed is 1746 rpm. Calculate its speed, slip frequency, & slip when it is supplied by a 230V, 30Hz source. 10
2. Explain the classification of variable frequency converter with neat circuit diagrams. 10
3. Explain the basic principles of operation of Induction motor. Also draw & explain its torque speed characteristics. 10

**UNIT - III**

1. What is need of drive circuits ? Draw & explain dc - coupled drive circuits with unipolar output. 10
2. Explain the power device protection in drive circuits. 10
3. Write a note on : 10
  - i) aluminium electrolytic capacitors.
  - ii) metalized polypropylene capacitors.

**UNIT - IV**

1. Draw circuit diagram & waveforms for turn on snubber and explain its operation. 10
2. Explain the snubber for 3  $\phi$  line commutated converters. Also derive the relation for values of CS & RS. 10
3. Write a short note on GTO snubber considerations. 10

**UNIT - V**

1. Draw circuit diagram and explain electric welding application. 10
2. Explain the need of improved utility interface and different methods used for it. 10
3. Write a short note on active shaping of the input line current. 10

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